

WILLIARD, (DEF.)

al

NEPHRECTOMIES

FOR

GUNSHOT WOUND

AND FOR

TUBERCULOUS KIDNEY.

*presented by the author -*

BY

DE FOREST WILLIARD, M.D.,

SURGEON TO PRESBYTERIAN HOSPITAL, LECTURER ON ORTHOPÆDIC SURGERY UNIVERSITY OF  
PENNSYLVANIA, CONSULTING SURGEON CRIPPLES' HOME.





NEPHRECTOMIES  
FOR  
GUNSHOT WOUND  
AND FOR  
TUBERCULOUS KIDNEY.

BY

✓  
DE FOREST WILLIARD, M.D.,

SURGEON TO PRESBYTERIAN HOSPITAL, LECTURER ON ORTHOPÆDIC SURGERY UNIVERSITY OF  
PENNSYLVANIA, CONSULTING SURGEON CRIPPLES' HOME.

---

REPRINTED FROM THE  
TRANSACTIONS OF THE AMERICAN SURGICAL ASSOCIATION,  
SEPTEMBER 18, 19, AND 20, 1888.

---



PHILADELPHIA:  
WILLIAM J. DORNAN, PRINTER.  
1889.





## NEPHRECTOMIES FOR GUNSHOT WOUND AND FOR TUBERCULOUS KIDNEY.

BY DE FOREST WILLARD, M.D., PH.D.,  
SURGEON TO THE PRESBYTERIAN HOSPITAL, PHILADELPHIA.

---

### I. GUNSHOT WOUND OF KIDNEY.

THE first recorded case of primary nephrectomy for gunshot wound was reported to this Association last year by Dr. Keen (*Trans. Amer. Surg. Assoc.*, 1887, vol. v. p. 193). My own operation followed in July, but as I had been prevented from attending the meeting of the Association, I was ignorant of the fact that his operation was other than a laparotomy for intestinal wounds. My case, occurring in the middle of the night, and with no chance for delay, I acted independently as the circumstances demanded.

A third operation has since been done in Philadelphia, by Dr. Mordecai Price (*Trans. Penna. State Med. Soc.*, 1888. *Med. and Surg. Reporter*, June 26, 1888).

Fortunately, there have been no wars since abdominal surgery has pressed so prominently to the front, but in the War of the Rebellion (*Med. and Surg. History War of the Rebellion*, surg. vols.) and in the Franco-Prussian War, the cases of kidney wound were practically entrusted to the curative powers of nature. In fact, the operation was practically unknown, even in the latter conflict, since Simon (*Chirurg. de Nieren*, Stuttgart, 1876), of Heidelberg, performed his first systematic nephrectomy in 1869.

### GUNSHOT WOUND.

CASE I.—A. B., mulatto, seventeen years of age, male, shot July 10, 1887, pistol 22-calibre, at such close range that coat, vest, shirt, and

skin were burned by powder. Ten minutes later he applied for admission to the Presbyterian Hospital, having walked a quarter of a mile, with only slight assistance. There was only a moderate amount of pallor and faintness, and the shock was not severe. Fifteen minutes later, however, the depression became more marked, the temperature fell to  $98^{\circ}$ , and the voice became feeble. The pallor steadily increased. The wound of entrance was found just above the eleventh rib, three and a half inches from the spinous process. No wound of exit was discoverable. There were no physical signs of injury of pleura or lungs. In voiding urine he passed twelve ounces of almost pure liquid blood. The pain in back and on the left side continually increased, but there was none upon the right side.

I saw him at 2 A. M., four hours after the accident. He was then cold, blanched, feeble-voiced, and rapidly sinking. Blood was almost constantly flowing from the urethra. . . . Pain in the left inguinal region was very great. On percussion, the whole left lumbar and inguinal regions were absolutely flat, and an apparently hardened mass occupied the entire left side of the abdomen. This dulness did not alter by change of position, and was decided to be blood with, perhaps, urine and feces that had escaped into the peritoneal cavity, and had coagulated sufficiently to prevent movement by gravitation. The abdomen was distended and tender, especially upon the left side, where pressure gave intense pain.

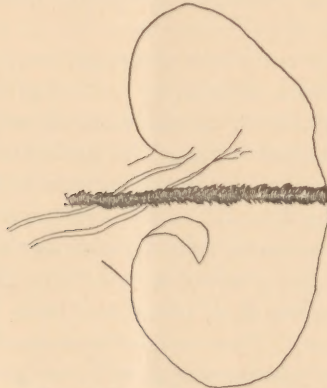
A severe wound of the urinary apparatus was, of course, evident, and from the near proximity of the assailant, and the downward track of the ball, as determined by the probe, it seemed almost certain that other abdominal contents had been injured.

To arrest the hemorrhage was necessarily the first indication, and as this was apparently progressing inside the peritoneal cavity, the anterior incision offered not only the hopes of reaching it most promptly, but of rendering possible, at the same time, a thorough cleansing of the peritoneal cavity, and also the suturing of wounded intestines or other tissues. Senn's method (*Trans. Amer. Med. Assoc.*, 1888) of injecting hydrogen gas for the detection of intestinal injury was not then known, and, as hemorrhage was rapidly destroying the life of my patient, such delay would have been unwarrantable. Rapidly cleansing the skin with hot, sublimate solution to avoid shock, I made an eight-inch incision in the median line. The bladder was found full of blood, but intact. The left ureter was in the same condition. Tracing it upward, I came upon the mass in the left inguinal region. It was blood, as I



anticipated, but not in the abdominal cavity. It was retro-peritoneal, having dissected up this membrane and insinuated itself into the connective tissue and muscles, until it extended from in front of the quadratus lumborum far around upon the side of the body, and downward into the pelvis. Above, the immense hæmatocele extended to the left kidney. Tearing through the peritonæum outside the colon, I exposed the kidney and easily found the wound of entrance, which was at the outer rim. The ball had traversed the entire width and had emerged at the hilum, cutting the pelvis and then the renal vessels (Fig. 1). Turn-

FIG 1.



Track of ball through kidney and vessels.

ing out the large surrounding masses of partially coagulated blood the vessels were secured by a strong aseptic silk ligature, and the ureter by another; pressure upon the aorta above effectually preventing any rapid bleeding during the enucleation. The kidney being cut away a quarter of an inch from the ligatures all hemorrhage was found to be controlled, and a close search was made for the ball, which seemed to have continued on its course across the body, keeping still behind the peritoneum. A finger carried up and down the aorta failed to provoke further hemorrhage, and the search was at last abandoned as the patient was almost moribund. No blood or feces were found in the peritoneal cavity. The stomach, spleen, liver, and intestines were uninjured. The pressure of the mass behind the thin membrane of the peritoneum caused a little bloody serum to exude within the cavity. One or two points that threatened rupture were carefully tied with fine catgut. A large sponge wet with a 1 : 5000 sublimate solution made from distilled

water was kept in the pocket left by the removed kidney, and excluded all air from the exposed end of the hæmatocele, after the removal of every fragment of clot and torn tissue that was found at this site. The peritoneal cavity was then thoroughly irrigated with hot distilled water.

The peritoneum over the site of the kidney was not stitched. Every precaution had been taken to prevent infection, and as the peritoneal cavity was thoroughly clean, a drainage tube was not inserted. The peritoneum at the seat of the incision was united by a separate row of catgut sutures, and the remaining tissues closed with sterilized silk. External wound closed with sublimate dressings, after thorough cleansing.

The patient's temperature was  $96.5^{\circ}$ , but two hours later he rallied well, after hypodermics of whiskey and digitalis. There was no vomiting, and during the day nourishment was well borne.

The clots in the bladder having been pushed out during the operation and the cavity cleansed, the patient was able to urinate without difficulty, and during the next twenty-four hours passed twenty-five ounces of urine, which was only slightly albuminous. After the second urination there was less staining with blood. Two hours after the operation temperature was  $99.4^{\circ}$ ; five hours later,  $101^{\circ}$ ; thirteen hours after operation,  $101.4^{\circ}$ . Pulse 100 during most of the day, and respiration 40. Only one-quarter of a grain of morphia was given.

The patient rested well during the night and suffered no pain. The abdomen was slightly tympanitic, but not painful.

Second day, morning temperature  $99.8^{\circ}$ , evening temperature  $101.2^{\circ}$ ; pulse 120 to 128; respiration 24 to 28. Pulse weak. Vomiting persistent if any liquid was introduced into the stomach. Whiskey, milk, champagne, wine-whey, cracked ice, all rejected. Moderate pain in abdomen that was controlled by one-eighth grain doses of morphia.

Twenty ounces of urine were passed in the twenty-four hours. It contained less blood, and only an appreciable amount of albumen.

The action of the skin had been assisted ever since the operation by the constant application of hot-water bags.

The stomach rejected all fluid immediately by a "hiccoughy" regurgitation during the night. The pain was moderate but the tympanites steadily increased.

Third day, morning temperature  $100.2^{\circ}$ , evening temperature  $100.8^{\circ}$ ; pulse 138 to 144; respiration 28 to 40. Vomiting of greenish mucus



continues, although nothing is given by the mouth. There is more pain in the abdomen, more tympany, and the face bears an anxious expression, although consciousness is perfect. The abdomen is tender, but apparently contains no fluid; and the wounds, both dorsal and abdominal, are perfectly healthy.

On consultation with Dr. Allis, it was decided that the peritonitis was not septic, and that re-opening and irrigation or drainage were not advisable.

Twenty ounces of non-albuminous urine were passed during the twenty-four hours.

The pain increased during the night and the vomiting persisted, the patient dying quietly on the fourth day, eighty-six hours after the injury, with no symptoms of uræmia.

Post-mortem examination ten hours after death. The abdominal wound was firmly adherent, and none of the sutures had suppurated. The intestines were only slightly agglutinated to the anterior wall or to each other, and there was but a small amount of plastic lymph upon any portion of the peritoneum. There was no serum or pus in the abdominal cavity, and the capillary injection was very moderate. There had been no injury of any abdominal organ save the kidney. The renal artery and vein were found to have been securely ligated midway between the aorta and the kidney. There was no pus at the site of the nephrectomy, and the large hæmatocele had undergone no decomposition, but the blood had insinuated itself into all the tissues of the left posterior portion of the abdomen, extending even into the meso-colon and meso-rectum. The ball had passed through the diaphragm immediately below the pleura, but the thoracic contents were uninjured. The eleventh rib was only slightly grazed. The missile was found beneath the sheath of the aorta, lying in close apposition to the tunica adventitia, just at the origin of the renal artery. The right kidney was healthy and only slightly enlarged and congested from overwork.

ANURIA.—So far as I can ascertain from the literature of the subject, my operation was the second primary nephrectomy for gunshot wound.

In Keen's case other serious injuries of stomach, liver, intestines, and spleen were present, yet his patient lived fifteen days, and did not die from the loss of the kidney, as she passed from twenty to forty ounces of urine daily. Intestinal gangrene pro-

duced the fatal result. The other kidney in fifteen days became longer and wider.

Price's case, seven months later, was also complicated by a serious wound of the liver, but finally recovered after multiple abscesses of the liver.

In my own case, the amount of urine secreted subsequently to the operation was never less than twenty ounces in the twenty-four hours.

From these three cases we may thus far assert that *a healthy kidney is capable of immediately taking up and successfully carrying on the offices of the two organs.*

The same result has been shown in a number of cases in which nephrectomy has become necessary during the progress of ovariectomy or other abdominal sections.

The same action was also found in Brandt's, Marvand's, and Hamilton's primary nephrectomies for knife wounds, all of whom recovered; and in Rawdon's extirpation for subcutaneous laceration, death did not occur until the fortieth day, and then from pyelitis occasioned by decomposing blood.

In Gross's statistics (*Trans. Amer. Surg. Assoc.*, vol. iii. 109), out of 101 cases, only 8 died of anuria, and 5 of these 8 had a diseased kidney upon the opposite side.

INCISION.—While deductions drawn from the statistics of Harris (*Amer. Journ. Med. Sci.*, July, 1882, p. 109), Billroth (*Wien. med. Woch.*, 1884, Nos. 23, 24, 25), Gross (*Trans. Amer. Surg. Assoc.*, 1885, vol. iii. p. 109. *Amer. Journ. Med. Sci.*, July, 1885, p. 79. *Phila. Med. Times*, May 2, 1885), Baum (*Phila. Med. Times*, February 21, 1885, p. 381), Weir (*New York Med. Journ.*, Dec. 27, 1884; *Annals of Surgery*, 1885, p. 309; also *Phila. Med. News*, 1884), Minges (*Journ. Amer. Med. Assoc.*, June 6 and 13, 1885), Otis (*Boston Med. and Surg. Journ.*, Oct. 13 and 20, 1887, vol. cxvii. p. 376), Brodeur (*De l'intervention Chirurg. dans les Affect. du Reins*, Paris, 1886), Czerny (*Transactions International Med. Congress*, London, 1881), Mardeul, and others would, in a general way, indicate a less mortality for the lumbar than for the anterior abdominal incision, yet gunshot wounds hold a distinctive place by themselves, and in all of these three cases the kidney

was most judiciously reached by the anterior route, for reasons that are very apparent.

One case was suicidal, one accidental, and one homicidal. In all the range was close, and the probability of injury to other organs was in the highest degree probable, since the bullet was impelled by its primary propulsive force. In two of these cases serious lesions coexisted which could only be reached by an abdominal incision; and in my own case, while the wound of the kidney was perfectly certain, yet there existed very strong evidences of abdominal invasion, in the presence of the large area of dulness upon the left side of the abdomen, and in the apparent presence of a semi-solid mass in that region.

Had I cut in the loin, I should have been obliged to work through a mass of circumferential clots and blood, and without the ability to compress accurately the aorta, might have lost my patient while adjusting the ligatures to the cut renal vessels. Moreover, even if successful in arresting hemorrhage, I should still have been in absolute ignorance as to whether the other kidney or the liver were injured, and I should have been uncertain as to the large mass of fluid upon the left side of the abdomen. Through the loin also I should have disturbed the hæmatocele to a much greater extent, and should probably have induced suppuration.

At the close of my operation I was confident that I had controlled the hemorrhage, that all the abdominal organs were intact, and that the peritoneal cavity was clean.

We have yet much to learn before we shall be able accurately to map out the exact course that will be pursued by a ball, and until our diagnosis improves vastly, we must operate upon the route that is most probable to give us success.

Even with the extensive lesions found in Keen's case, he was obliged to cut with the "probability" of such lesions, which, fortunately, in his case, could be converted into a certainty that the abdominal cavity had been entered before laying open the peritoneum, since his incision naturally lay across the course of the ball if it had followed beneath the skin.

In von Brüns' case, the incision was lumbar, but the opera-



tion was a secondary one for suppuration, rather than for the gunshot wound, yet his patient died in ten hours.

The three cases of knife wound lumbar nephrectomies that all recovered, cannot rightfully be classified under the same head with bullet wounds, since their limit was more definite, and, in fact, no other incision could be suggested, since the kidneys lay exposed in the wounds.

Rawdon might possibly have expressed the blood-clots from the bladder or have washed them out, had he made an abdominal incision, and thus saved his patient from the evils of decomposition, and from the subsequent cystotomy and death.

West saved his case of traumatic rupture by lumbar incision, but it was a secondary operation following nephrotomy. Mudd's case was very similar, and was successful.

When the whole abdominal cavity may require exploration, neither Thornton's nor Morris' lateral retroperitoneal incision, nor Langenbeck's incision in the linea semilunaris will give as good an exposure as the median.

In the general discussion upon abdominal surgery in this Association at its meeting last year, Agnew and others took the true position in affirming, that when there is a reasonable degree of evidence that there is a penetrating abdominal wound, especially a shot wound, it is our duty to open the cavity.

**DRAINAGE.**—Keen inserted a drainage tube through the loin bullet wound, but it did not serve as a drain to the abdominal cavity, and was removed on the sixth day. Apparently it acted negatively.

Price drained anteriorly.

I inserted none, for the reason that no urine had escaped into the peritoneal cavity either before or during the operation, and, although I had a loin bullet wound, yet by thoroughly cleansing the track, I hoped to secure rapid healing, and exclude air that would act so disastrously upon the hæmatocele contents. At the post-mortem no pus was found either in the track of the bullet nor in the kidney pouch.

Moreover, a drainage incision in the loin might have started

hemorrhage from the small vessels that would have delayed the operation when moments were precious.

The only admissible rule is to be guided by the conditions of the individual case.

DISPOSITION OF BLOOD.—If the blood has escaped into the peritoneal cavity, there is necessarily but one course to be pursued; irrigation and the sponge must be brought into thorough requisition.

If retroperitoneal, and extensive, filling all the interspaces of connective and muscular tissue, its removal is an impossibility. In my own case it had dissected beneath and lifted up one-quarter of the whole posterior surface of the peritoneum, and had filled the meso-colon and meso-rectum in addition to all the other tissues.

To make incisions for its escape into the peritoneal cavity would not liberate one-half of it, and would subject the abdominal cavity to all the risks of infection from its decomposition. Punctures from the loin would also be ineffectual and dangerous, even if strict asepsis were enforced. To permit it to remain while opening the way for suppuration and discharge into the peritoneal cavity seemed the minor danger.

At the upper end where it communicated with the pouch vacated by the kidney it was thoroughly cleansed and kept aseptic through all the operation, trusting that but little urine had escaped into its meshes.

My greatest doubt was as to the propriety of draining it, together with the nephrectomy pouch, through the bullet wound. My decision was in the negative, and I see no reason to regret the course pursued so far as relates to the hæmatocele. The danger of pus formation at this very point, from the escape of tiny particles of clot or torn tissue in the cleansing process, however, gave me great anxiety during the next four days, and I was several times upon the point of enlarging the dorsal wound and endeavoring to drain off products of inflammation that I feared were exciting the peritonitis. The post-mortem, however, proved that no such contaminating forces existed, and that no decomposition had occurred, even at this point.

When the dangers of urinary infiltration are added to the risks of hemorrhage, we can scarcely credit the statistics of Edler (Langenbeck's *Archiv. f. klin. Chir.*, Bd. xxxiv., 1887), when he states that eighty-five per cent. of "uncomplicated" cases recover, and it is probable that fuller comparisons will change this record. In complicated cases, he fixes the recoveries at only sixteen per cent.

Knife wounds of the loin may expose the kidney and perhaps only slightly injure its substance. Hence, though the organ may be largely exposed, the peritoneal cavity may be intact, the hemorrhage will escape externally, and thorough drainage being secured, the results should be far better than in gunshot injuries. Hence, the organ can often be saved. Richardson (*Trans. Amer. Surg. Assoc.*, 1887, vol. v. p. 215) makes the remarkable statement that in thirty-one cases of knife wounds penetrating the abdominal cavity in various positions, only seven died, thus showing the great difference that exists between knife and bullet wounds.

The danger of non-removal of a kidney injured by a bullet is very great when the peritoneum has been opened; since, in addition to extravasation of urine, secondary sloughing would almost certainly contaminate the abdominal cavity with septic pus and urine. All gunshot wounds tend to septic peritonitis. If Thiriar's (*Annales des Mal. Org. génito-urinaires*, Nov. 5, 1885. *New York Med. Journ.*, 1, 30, 1886, p. 114) observation in regard to the significance of the chlorides in the urine should be proven true, it will be of great service in the diagnosis of septic conditions.

DIAGNOSIS.—The absence of blood in the urine is not always a symptom that no wound is present. In Keen's case, by some peculiar action, the laceration prevented hemorrhage into the uriniferous tubules, and the urine drawn from the bladder was perfectly clear. This urine may have been in the bladder at the time of the accident.

The amount of shock is not a certain indication of the extent of the injury. My own patient walked a quarter of a mile, with a perforated kidney and a cut renal artery and vein, yet the



shock only became great after hemorrhage had exhausted him. On the other hand, I have seen the most profound shock and collapse within five minutes after a small pistol-ball had been merely lodged in the dorsal muscles.

Great and prolonged depression of temperature, however, usually means serious injury of organs. Severe contusions sometimes give the same result.

The probable route of the ball, as determined by large probe, should receive careful consideration.

In the present case the ball was imbedded in the tunica adventitia of the aorta; ulceration of the coats might have followed had the patient lived sufficiently long.

Many cases of nephrectomy die, since to the primary shock of the wound is added the loss of blood, and then the shock of the operation.

Although the kidney is an important organ, yet the injury to the vital powers would seem to indicate that the disturbance of the fibres of the sympathetic during enucleation may assist in producing the serious depression. Added to all this are the exposure of organs and intestines, and the lengthy manipulations sometimes required to close intestinal or other wounds.

#### CONCLUSIONS.

1. The opposite kidney, if sound, is perfectly capable of *immediately* taking up and carrying on the urinary function.

2. The dangers of hemorrhage and of urinary infiltration when the peritoneum is injured, are greater than those of nephrectomy.

3. In minor gunshot wounds, the kidney can be reached and properly treated through the lumbar incision, but when there is a probability that other structures have been injured, the abdominal incision is the preferable one, since it permits both examination and repair of wounded tissues, and also gives opportunity for thorough cleansing of the peritoneal cavity.

4. Drainage, either anteriorly or posteriorly, will usually be advisable, but will depend upon existing conditions.

5. If the escaped blood be retro-peritoneal, it should be allowed to remain undisturbed.

6. In operating, search should first be instituted for injuries at the point of entrance of the ball. The finding of an imbedded missile may relieve the surgeon from any further handling of abdominal contents, and thus add greatly to the chances of recovery.

7. Minimize the time of operations, and the length of exposure of abdominal contents, by every possible means commensurate with precision and safety.

#### PRIMARY NEPHRECTOMIES.

##### *Gunshot wounds.*

1. Keen, Philadelphia, April 1, 1887. Female, aged eighteen years. No. 32 pistol-ball; suicidal. Left kidney (liver, spleen, stomach, and intestines also injured). Abdominal incision; drainage through loin wound. Death on fifteenth day, from gangrene of injured bowel.

2. Willard, Philadelphia, July 10, 1887. Male, aged seventeen years. No. 22 pistol-ball; homicidal, but at close range. Left kidney (renal artery and vein cut, and ball lodging in wall of aorta). Abdominal incision; not drained, as peritoneal cavity was clean. Death on fourth day, from the exhaustion of primary hemorrhage, shock, and peritonitis.

3. Price (Mordecai), Philadelphia, January, 1888. Female, aged fourteen years. No. 32 pistol-ball; accidental. Right kidney (liver also injured). Abdominal incision; drainage anteriorly. Recovery, after multiple abscesses of liver.

##### *Secondary operation. Suppuration following gunshot wound.*

1. Von Brüns, Wurtemberg, March 23, 1871. Male, aged thirty-nine years. Lumbar incision; extensive suppuration following gunshot wound. Died in ten hours, of shock.

##### *Primary knife wounds.*

1. Brandt, Klausenberg, Austria, January 7, 1873. Male, aged twenty-five. Kidney lying in knife wound in loin. Lumbar incision. Recovery.

2. Marvaud, Algiers, April, 1875. Young female. Kidney exposed in wound. Lumbar incision. Recovery.

3. Hamilton, China, July 18, 1885. Male. Kidney exposed. Lumbar incision. Recovery.

#### SECONDARY OPERATIONS.

##### *Traumatic rupture.*

1. Rawdon, Liverpool, 1882. Male, aged twelve years. Subcutaneous laceration of right kidney from fall of eight feet. Lumbar incision; blood in bladder decomposing, necessitated cystotomy on the fourth day. Cystitis and pyelitis of left kidney. Death on fortieth day. (*Proc. Royal Med. and Chir. Soc.*, 1882, p. 137. *Lancet*, May 26, 1883, p. 907.)

2. West, 1883. Male, aged fifteen years. Traumatic rupture of left kidney, followed by suppuration; nephrotomy, followed by nephrectomy. Recovery. (London *Lancet*, March 10, 1883, pp. 424, 548.)

3. Mudd, H. H., St. Louis, June 5, 1888. Male, aged five years. Subcutaneous laceration of right kidney, from passage of carriage wheel. Bloody urine; no external wound. Lumbar tumor appeared in fourth week; nephrotomy on twenty-sixth day; kidney lacerated; drained; nephrectomy on fifty-first day. Recovery. Kidney had undergone parenchymatous degeneration; numerous hemorrhagic infarctions; urine secreted by opposite kidney contained albumin, pus, and casts. Specific gravity 1002. (See Discussion, p. 529, Dr. Mudd.)

Weir and Greig Smith both mention a nephrectomy for injury of kidney, by Cartwright, but the reference has escaped my eye.

#### NEPHRECTOMY FOR TUBERCULAR KIDNEY.

CASE II.—Mrs. G., aged thirty-two years, married for eight years, but never pregnant, was seen in consultation with Dr. Longenecker, July 1, 1888. The only tubercular history obtainable was that an aunt had died of phthisis. She considered herself in fair health until ten months previous, when she began slowly to fail in strength, and soon experienced slight pain in the right loin. A month later, a small amount of blood occasionally appeared in the urine, and soon afterward pus made its appearance. The pain had been decided, but never severe; within the past month it had become much more positive. Emaciation had been progressive, and was now extreme. The patient had been confined to her bed for more than a month, and was very



feeble, pale, and exhausted. The morning temperature was  $99^{\circ}$ , the afternoon rising to  $100^{\circ}$ , and rarely to  $101^{\circ}$ . Pus was passed from the bladder in large quantities. The urine was albuminous, but contained no casts, and no distinctive cell elements aside from blood and pus. Specific gravity 1019. About seven weeks ago she first noticed a tumor situated in the right side of the abdomen. This growth is now visible to the naked eye; it occupies the space from the site of the right kidney to the linea semilunaris in front, and extends vertically from the lower border of the ribs to the line of the anterior superior spinous process. The colon lies in front of it, and resonance is distinguishable between the liver and the tumor. The general outline is smooth and rounded, but the mass is not movable. There is an indistinct outline of dulness and hardening running down into the pelvis. The growth is sensitive but not painful, and the contents are firm but not hard. The resistance is rather that of semi-elasticity, without any positive sense of fluctuation. As the patient was in an extremely feeble condition, and sinking rapidly, and as there was an uncertainty in the diagnosis between purulent kidney and renal sarcoma, the patient was removed to the Presbyterian Hospital, and an exploratory incision advised. Thorough antiseptic precautions were taken as to room, instruments, steps of operation, etc. The median abdominal incision was chosen on account of the large size of the tumor, and its anterior protrusion. Upon opening the cavity, a large sac was found occupying the right region of the abdomen. It extended from the loin above nearly to the pelvis, and ended below in two prolongations, one of which was evidently a pus-filled ureter; the other, a mass that extended along the line of the bloodvessels beneath Poupart's ligament. Puncture of this large sac yielded only a few drachms of pus, and in nowise diminished its size. A finger carried into the opening revealed a small cavity, with hardened walls, which wall, however, was easily broken down, and led into another cavity. The nature of the growth being thus determined, extirpation of the kidney was at once performed by tearing up the sac about the organ, externally to the colon, and ligating the renal artery and vein with an aseptic silk ligature. The ureter was then secured well down toward the bladder, and the mass cut away. All remains of pus were carefully mopped, large irrigations of the peritoneal cavity were made with hot distilled water, and a drainage tube introduced from the site of the nephrectomy to the abdominal wound. Another tube was placed in Douglas's cul-de-sac, and the wound closed with a single row of aseptic silk sutures. Sublimate

dressings were quickly applied, as the woman had only been kept alive by hypodermatics of whiskey and digitalis, together with the hot douching. External warmth, and all other measures were put in practice, and at the end of an hour seemed to have been successful in establishing reaction, as her pulse was quite perceptible at the wrist, the temperature had risen to  $99^{\circ}$ , and she became perfectly conscious. Two hours after the completion of the operation, however, she died. The removed kidney was six inches long, four wide, and three thick. With the pus in situ, it weighed thirty ounces. The mass was riddled with abscesses, the majority of the pockets containing pus, while others were filled with cheesy degenerating masses. (See Fig. 2.)

FIG. 2.



Tuberculous kidney.

A post-mortem of the abdominal cavity only was permitted. No hemorrhage had occurred.

The tubular mass that had been observed along the line of the external iliac artery, when traced upward, was found to lead up along the aorta as high as the site of the removed kidney. Separated two lines from the thickened pouch from which the organ had been taken,

and entirely unconnected with it, as far as could be ascertained, was another pus sac.

There was no disease of the vertebræ. This pus may have originated from a contiguity of inflammation, as it lay directly behind the kidney. The sac contained at least two ounces and the pus had burrowed down along the line of the aorta and iliac vessels until it had just reached a point beneath Poupart's ligament, where the cavity would not admit the little finger. The pus was thin and odorous, but not curdy.

The left kidney was enlarged one-fifth, but was not diseased. Other organs normal.

REMARKS.—The diagnosis of the tumor being uncertain and the patient rapidly dying, an exploratory incision was thoroughly justifiable, as the symptoms pointed so markedly to the presence of pus.

As calculous pyelo-nephritis was not indicated, the abdominal incision was preferable, in view of the semi-solid nature of the growth and its large size. Gross (*Trans. Amer. Surg. Assoc.*, 1885, vol. iii. p. 113) and Smith, J. Greig (*Abdominal Surgery*, 2d edition, 1888, p. 537), agree that this incision is the better one in so-called "scrofulous kidney."

The former advises non-removal in the later stage, as the total mortality of primary extirpations is forty-one per cent. In earlier stages, however, he speaks favorably of nephrectomy, while Brodeur (*De l'Intervention Chir. dans les affec. du Reins*, 1886; *Journal Amer. Med. Assoc.*, May 26, 1888, p. 652) advocates the opposite course. Of the twenty cases of tubercular kidney removed, six out of the seven ventral nephrectomies recovered, while but six of the thirteen lumbar operations survived. As the opposite kidney is so often similarly affected the abdominal incision seems to me far preferable, as it affords opportunity for examination. Lange (*Trans. Ninth Inter. Congress*, 1887, vol. i. p. 558) holds that, even though the opposite organ be diseased, yet nephrectomy gives relief and prolongs life. Catheterization of the ureters to ascertain the existence of disease in the other kidney was not practised owing to the extreme weakness of the patient. A small catheter as first used by Pawlik (*Glasgow Med. Journ.*, July, 1885), is the



most simple means of securing the urine directly from one ureter (*Transactions Philada. Obstet. Soc.*, 1888), and there is no necessity for the painful manipulations described by J. Greig Smith (*Abdominal Surgery*, 2d edition, 1888, p. 546) and Schultz (*Nouv. Arch. d'Obstet. et de Gynec.*, ii. 5, p. 205). The ureter during the operation upon this patient was not turned out and fixed in the wound, both on account of the extremely dangerous condition of the patient which forbade delays of any sort, but also because by cutting it short it was believed that shrinkage and closure would occur after the source of pus was removed. By this plan also, less danger would arise of subsequent interference with the intestines by a band.

While "solitary kidney" is of rare occurrence (*Trans. Phila. Path. Soc.*, 1869, Willard; and *New York Med. Journ.*, Jan. 30, 1886, p. 134), yet out of five hundred nephrectomies that have been made, Polk (*New York Med. Journ.*, Feb. 17, 1883) was unfortunate enough to remove the organ in a patient who possessed no other, as was revealed by post-mortem eleven days later. This condition exists once in about four hundred cases. Nephrectomy, whether abdominal or lumbar, is certainly a most serious operation and should never be undertaken without a most careful and exhaustive survey of other possible means of relief; yet while the mortality following the operation is high, it must be considered that the necessity for such an operation indicates in itself a most grave condition. Had nephrotomy been undertaken in my case, the pus pouch behind the kidney would have been first entered and quite possibly the renal organ, the true seat of disease, would not have been reached at all, as the wall of separation between the two sacs was, at least, two lines in thickness, and there would have been no sense of fluctuation beneath to lead on to the organ.

Nephrotomy in a kidney such as existed in the present case, where there were at least scores of depots of pus, would have ended, even if the organ had been reached, either in leaving many of these points unopened, or else the entire structure of the kidney would have been cut in pieces.

Greig Smith says that scrofulous kidneys "furnish the greatest

number of examples where nephrotomy is futile and nephrectomy gives the only chance of recovery." He also states "that any variety of extensive suppuration not localized in one district demands nephrectomy." He states again, "that preliminary nephrotomy, while advantageous in most cases of kidney suppuration, is here injurious."

The impossibility of reaching and draining all these abscesses makes nephrotomy in tubercular kidney more dangerous than nephrectomy.

Briddon (*New York Med. Journ.*, Jan. 30, 1886, p. 114), after attempting lumbar nephrotomy, preferred abdominal nephrectomy.

There have been more deaths from "shock" in lumbar incisions, than in abdominal, although the former gives diminished risks as to peritonitis, and is usually undertaken for a less serious class of cases.

In simple suppurative non-tuberculous cases, doubtless preliminary nephrotomy greatly increases the favorable chances in subsequent nephrectomy.

*Note.*—In addition to the references already given and the bibliography in J. Greig Smith's *Abdominal Surgery*, see *Nouv. Dict. de Méd. et de Chir. prat.*, t. xxx., Reins; Chavasse, *Lancet*, February 26, 1887; Guyon, *Annal. des Malad. des Org. Gen. Urin.*, March, 1887; Wagner, *Deutsche Zeits. f. Chir.*, 1886, xxiv. 56; Braun, *Centralb. f. Chir.*, 1886, No. 14; Pilcher, *Annals of Anat. and Surg. Soc.*, Brooklyn, 1879, 43; Orłowski, *Deut. Zeits. f. Chir.*, December, 1885; Mannrin *Rev. Chir.*, Paris, 1885, v. 48; Stephen Smith, *Operative Surgery*, 1887; *Transactions Congr. Franc. de Chir.* 1886; *N. Y. Med. Record*, December 12, 1885.







